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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:

Michael Joseph Stirniman et al.

Serial No.: 09/833,748

Filing Date: April 12, 2001

For: COLD TRAPS FOR VAPOR LUBRICATION PROCESSES

Examiner: Robert A. Hopkins

Group Art Unit: 1762

AMENDMENT UNDER 37 CFR 1.111

Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the telephone call from the Examiner, please amend this application as follows:

IN THE SPECIFICATION

Please replace the six paragraphs starting on page 7 line 7 and ending on page 9 line 9 with the following paragraphs.

a2

FIG. 2 illustrates one example embodiment of a vapor lubrication station including major components and its interconnections to adjacent process chambers according to the present invention. Shown in FIG. 2 are the vapor lube station 210 and a

vacuum tunnel 220. Vapor lube station 210 deposits a thin uniform lubrication layer over a disc surface using a vapor deposition technique also referred to as a vapor lubrication process. The vapor lubrication process includes evaporating lubrication molecules continuously in the vapor lubrication station held under vacuum using a specially designed evaporator, and emitting evaporated lubrication molecules through special diffuser plates to control vapor emission onto the discs to provide a uniform thickness of lubricant onto the disc surface.

A2 cont.

The vacuum tunnel 220, as shown in FIG. 2, is coupled to the vapor lube station 210 through an entry/exit port 230. The vacuum tunnel 220 serves as a main or common transport chamber interconnecting various upstream and downstream process chambers to receive the discs for a sequential processing. The vacuum tunnel 220 is generally held under low working pressure, e.g., typically around $5x10^{-5}$ to $5x10^{-9}$ Torr, by means of high performance vacuum pumps 240 as shown in FIG. 2.

Also shown in FIG.2 are multiple entry/exit ports 250 disposed in the vacuum tunnel 220 to aid in the sequential processing of the storage discs. The entry/exit ports can be gates and/or valves that open to receive the discs and close after outputting the discs. Further, FIG.2 shows conveying devices such as cassettes 260 disposed at various locations in the vacuum tunnel 220 to aid in the sequential/batch processing of the discs. The cassettes are shown carrying the discs 265. In addition, FIG. 2 shows a lifter 270 disposed in the vacuum tunnel 220 near the vapor lubrication station 210 to aid in loading the discs 265 into the vapor lubrication station 210 for coating the discs 265, and to unload discs from the vapor lubrication station 210 after completion of the coating of the discs through the entry/exit port 230.

One or more cold traps 280 are disposed around the entry/exit port 230 to prevent migration of lubrication molecules that are not deposited onto the storage discs during the vapor lubrication process in the vapor lubrication station 210 into adjacent process chambers through the vacuum tunnel 220. In some embodiments, the adjacent process chambers can include adjacent process chambers used in depositing successive layers on the discs. Adjacent process chambers can also include transport chambers used in transporting the storage discs between the process chambers. In some embodiments, additional cold traps 280 are disposed in the vacuum tunnel 220 around the entry/exit ports 250 to prevent migration of the lubrication molecules to the adjacent process chambers during transfer of the storage discs from upstream processes to the vapor lubrication station 210 and/or during transfer of the storage discs 265 from the vapor lubrication station 210 to downstream processes.

A2 cont

The transporting of storage discs 265 is accomplished using various disc handling systems such as transport mechanisms, conveyors, lifters, and/or one or more cassettes 260 as shown in FIG.2.

In some embodiments, the cold traps 280 include cold trapping surfaces 282 to prevent migration of lubrication molecules that are not deposited onto the disc into the adjacent process chambers. The temperature of the cold trapping surfaces 282 to trap the lubrication molecules is held around -195°C to 25°C during operation. The cold trapping surfaces 282 are cooled using refrigerants such as liquid nitrogen, low-temperature refrigerant, cold water, cold air, and/or any other cooling medium suitable for cooling the cold trapping surfaces 282. In some embodiments, the cold traps 280 include one or more temperature sensors 285 to sense the temperature of the cold trapping surfaces 282 and to

a2 cont.

output a signal proportional to a sensed temperature. In this embodiment, the sensors 285 are coupled to a control circuitry 290 to monitor the sensed temperature of the cold trapping surfaces 282 by receiving the signal from the sensors 285 and to automatically shut-off the operation of the vapor lube station to prevent accidental migration of the lubrication molecules due to a failure in the operation of the cold traps 280.

Please replace the one paragraph starting on page 11 line 10 and ending on page 11 line 22 with the following paragraph.

a3

Also discussed is a vapor lubrication station 210 that includes one or more cold traps 280 to prevent migration of lubrication molecules that are not deposited onto storage discs 265 during a vapor lubrication process in the vapor lubrication station 210 into adjacent process chambers. Further the cold traps 210 include cold trapping surfaces 282 to trap and prevent migration of lubrication molecules into transport chambers used in transporting the storage discs 265 between the process chambers. Also, the station 210 includes one or more temperature sensors 285 to sense the temperature of the cold trapping surfaces 282 and to output a signal proportional to the temperature. Further, the station 210 includes a control circuitry 290 coupled to the temperature sensors 285 to automatically shut-off the operation of the vapor lubrication station 210 to prevent accidental migration of lubrication molecules in case of a failure in the operation of the cold traps 280.